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(54) CONDUCTIVE RESIN COMPOSITION

(57)Abstract:

PURPOSE: To reduce contamination due to the release of carbon black by incorporating an olefin resin and a styrene/conjugated diene block copolymer into a conductive resin composition used for IC packaging and consisting of a thermoplastic resin and carbon black.

CONSTITUTION: 100 pts.wt. of at least one thermoplastic resin (A) comprising a polyphenylene resin, a polystyrene resin or an ABS resin is blended with 5-50 pts.wt. carbon black (B), an olefin resin (C) in an amount of 1-30 pts.wt. based on 100 pts.wt. in total of components A and B, a styrene/conjugated diene block copolymer (D) in an amount of 0.2-10 pts.wt. based on 100 pts.wt. in total of components A and B, and if necessary, other additives to give the conductive resin composition for IC packaging, with a surface resistivity of 10^2 to $10^{10}\Omega$.

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**** NOTICES ***

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2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] A conductive resin constituent for IC package characterized by the following (A) a conductive resin constituent for IC package which consists of a block copolymer manufactured from at least one kind of thermoplastics chosen from polyphenylene ether system resin, polystyrene system resin, or ABS system resin, (B) carbon black, (C) olefin system resin, (D) styrene, and conjugated diene -- setting -- (**) -- the thermoplastics 100 weight section (aforementioned [A]) -- receiving -- (B) carbon black 5 - 50 weight sections And it comes to carry out 0.2-10 weight section content of one sort or two sorts or more of block copolymers manufactured from (C) olefin system resin 1 - 30 weight sections, and (D) styrene and conjugated diene with the total quantity to the total quantity 100 weight section of the aforementioned (A) thermoplastics and (B) carbon black, and a surface specific resistance value of a (b) conductive resin constituent is 102-1010ohms.
[Claim 2] A conductive resin constituent for IC package according to claim 1 characterized by the olefin system resin (aforementioned [C]) being polyethylene resin.

[Claim 3] two or more sorts which are different in a block copolymer manufactured from the aforementioned (D) styrene and conjugated diene -- containing -- one [among those,] of at least the others that at least one is [and] the stellate block copolymer of 50 - 90 % of the weight of styrene (D1) contents -- stellate [of 10 - 50 % of the weight of styrene (D2) contents], or a line -- a conductive resin constituent for IC package according to claim 1 characterized by being a block copolymer.

[Claim 4] two or more sorts which the olefin system resin (aforementioned [C]) is polyethylene resin, and are different in a block copolymer manufactured from the aforementioned (D) styrene and conjugated diene -- containing -- one [among those,] of at least the others that at least one is [and] the stellate block copolymer of 50 - 90 % of the weight of styrene (D1) contents -- stellate [of 10 - 50 % of the weight of styrene (D2) contents], or a line -- a conductive resin constituent for IC package according to claim 1 characterized by being a block copolymer

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] One sort or two different sorts or more of block copolymers manufactured by this conductive resin constituent from olefin system resin, styrene, and conjugated diene are made to contain in this invention in the conductive resin constituent for IC package which consists of at least one kind of thermoplastics and carbon black which were chosen from polyphenylene ether system resin, polystyrene system resin, or ABS system resin. Therefore, desorption, such as carbon black by the wear at the time of contact with IC etc., is related with the conductive resin constituent which decreased contamination of IC used as a cause etc. remarkably.

[0002]

[Description of the Prior Art] The injection tray, the vacuum-forming tray, the magazine, the embossing carrier tape, etc. are used as a package gestalt of the electronic parts using IC or IC from the former, and in order to prevent destruction of IC by static electricity etc. to these containers, the method of distributing the method of applying an antistatic agent to the surface of (1) container, the method of applying (2) conductive paints, (3) antistatic agents, or a conductive filler etc. is given. However, the engine performance for which it was easy to produce the desorption of the antistatic agent by the outflow by moisture and wear, and it was stabilized by the method of (1) by use of long duration although sufficient antistatic effect was shown immediately after spreading is not obtained. Moreover, a surface specific resistance value is also unsuitable to the package of IC of which it is about 10^9 - 10^{12} ohms, and the severe antistatic effect is required. The method of (2) has the defect of polluting the lead section of IC while it loses the antistatic effect again for the peeling omission by wear that spreading tends to become uneven at the time of manufacture and destroys IC. In the method of (3), the engine performance for which the addition reduced the physical properties of resin in the large quantity for necessity, and the antistatic agent was greatly influenced with humidity and its surface specific resistance value was stable is not obtained.

[0003] Moreover, as a conductive filler, metal impalpable powder, a carbon fiber, carbon black, etc. are mentioned. The surface specific resistance value by which could tend to do the skin of only a resinous principle and a moldability falling remarkably although conductivity sufficient by little addition is acquired, and making homogeneity distribute this money-paid-on-account group impalpable powder and carbon fiber was difficultly stabilized on the surface of mold goods is hard to be acquired. Although generally used from carbon black being able to distribute homogeneity by examination of kneading conditions etc., and the stable surface specific resistance value being easy to be acquired to these, since there is the necessity of adding carbon black so much, there is a phenomenon in which a fluidity and a moldability fall.

[0004] Conventionally, as resin which distributes carbon black, polyvinyl chloride system resin, a polypropylene resin, polyethylene terephthalate system resin, polystyrene system resin, and ABS system resin are used as an object for general, and polyphenylene ether system resin, polycarbonate resin, etc. are used as an object for heatproofs 100 degrees C or more. Even if polystyrene system resin and ABS system resin add [polyphenylene

ether system resin] carbon black so much compared with other resin in the object for the inside heatproofs of these resin as an object for general, there is no remarkable fall of a fluidity or a moldability, and it excels also in the field of cost further. However, the mold goods of the constituent which added carbon black so much had the defect that carbon black tends to be desorbed from the surface of mold goods by wear.

[0005]

[Problem(s) to be Solved by the Invention] This invention is what solves this defect. Polyphenylene ether system resin, In the conductive resin constituent for IC package which consists of at least one kind of thermoplastics and carbon black which were chosen from polystyrene system resin or ABS system resin By making this conductive resin constituent contain the mixture of two or more sorts of different block copolymers manufactured from olefin system resin, styrene, and conjugated diene Desorption, such as carbon black by the wear at the time of contact with IC etc., tends to offer the conductive resin constituent which decreased contamination of IC used as a cause etc. remarkably.

[0006]

[Means for Solving the Problem] Invention of the 1st of this invention Namely, (A) polyphenylene ether system resin, At least one kind of thermoplastics chosen from polystyrene system resin or ABS system resin, (B) In a conductive resin constituent for IC package which consists of a block copolymer manufactured from carbon black, (C) olefin system resin, (D) styrene, and conjugated diene (B) carbon black 5 - 50 weight sections are contained to the thermoplastics 100 weight section (aforementioned [A]). (**)-- As opposed to the total quantity 100 weight section of the aforementioned (A) thermoplastics and (B) carbon black And (C) olefin system resin 1 - 30 weight sections, (D) It comes to carry out 0.2-10 weight section content of one sort or two sorts or more of block copolymers manufactured from styrene and conjugated diene with the total quantity. And it is the conductive resin constituent for IC package characterized by a surface specific resistance value of a (b) conductive resin constituent being 102-1010ohms.

[0007] Invention of the 2nd of this invention is the conductive resin constituent for IC package of the 1st invention characterized by the olefin system resin (aforementioned [C]) being polyethylene resin. two or more sorts which are different in a block copolymer by which invention of the 3rd of this invention is manufactured from the aforementioned (D) styrene and conjugated diene -- containing -- one [among those,] of at least the others that at least one is [and] the stellate block copolymer of 50 - 90 % of the weight of styrene (D1) contents -- stellate [of 10 - 50 % of the weight of styrene (D2) contents], or a line -- it is the conductive resin constituent for IC package of the 1st invention characterized by being a block copolymer. The olefin system resin (aforementioned [C]) of invention of the 4th of this invention is polyethylene resin. Two or more sorts are contained. and a block copolymer manufactured from the aforementioned (D) styrene and conjugated diene is differed -- At least one of them is the stellate block copolymer of 50 - 90 % of the weight of styrene (D1) contents. other one [and / at least] -- stellate [of 10 - 50 % of the weight of styrene (D2) contents], or a line -- it is the conductive resin constituent for IC package of the 1st invention characterized by being a block copolymer.

[0008] Hereafter, this invention is further explained to details. In this invention, at least one kind of thermoplastics chosen from (A) polyphenylene ether system resin, polystyrene system resin, or ABS system resin is used. Polyphenylene ether system resin

means resin which uses polyphenylene ether resin and polystyrene system resin as a principal component. A content of polyphenylene ether resin in the total quantity 100 weight section of polyphenylene ether resin and polystyrene system resin has desirable 28 - 86 weight section. Under in 28 weight sections, sufficient dynamics property as polyphenylene ether system resin is not acquired, but if 86 weight sections are exceeded, fabrication will become difficult by fluid fall. A homopolymer or a copolymer indicated by U.S. Pat. No. 3383435 number is indicated to be this polyphenylene ether resin.

[0009] Polystyrene system resin used by this invention means what uses common polystyrene resin or high-impact-polystyrene resin, and such mixture as a principal component. ABS system resin means what uses as a principal component a copolymer which made a subject three components of acrylic nitril-styrene butadiene rubber.

[0010] (B) carbon black used by this invention is furnace black, channel black, acetylene black, etc., its specific surface area is preferably large, and conductivity little [an addition to resin] and advanced is acquired. For example, they are S.C.F. (Super Conductive Furnace), E.C.F. (Electric Conductive Furnace), KETCHIEN black (trade name made from LION-AKZO), and acetylene black. An addition of carbon black is an addition which can set a surface specific resistance value to 102-1010 ohms, and (B) carbon black 5 - its 50 weight sections are desirable to the (A) thermoplastics 100 weight section. Conductivity with an addition sufficient in under 5 weight sections is not acquired, but a surface specific resistance value rises, and if 50 weight sections are exceeded, characteristic values, such as aggravation of homogeneity dispersibility with resin, a remarkable fall of fabrication nature, and a mechanical strength, will fall. Moreover, if a surface specific resistance value exceeds 1010 ohms, sufficient antistatic effect will not be acquired, but it is 102. There is a possibility that generation-of-electrical-energy ability may be too good, and may destroy IC, under by omega.

[0011] As (C) olefin system resin used by this invention, copolymers which use a homopolymer of ethylene and a propylene, ethylene, or a propylene as a principal component, and also these blend objects are mentioned, for example. It is desirable to use polyethylene system resin represented by low-density-polyethylene resin, high-density-polyethylene resin, and straight chain-like low-density-polyethylene resin also in these especially in this invention. (C) Melt flow index of olefin system resin is 0.1g / 10 minutes or more in 190 degrees C and 2.16kg (it measures according to JIS-K -7210) of loads, under for this numeric value, kneading with polyphenylene ether system resin, polystyrene system resin, and ABS plastics becomes difficult, and a good constituent is not obtained. To the total quantity 100 weight section of (A) thermoplastics and (B) carbon black, 1 - 30 weight section is desirable still more desirable, and an addition of olefin system resin is 3 - 25 weight section. If under 1 weight section of an addition is [the effect] inadequate and 30 weight sections are exceeded, it will become difficult to distribute homogeneity in polyphenylene ether system resin, polystyrene system resin, and ABS system resin.

[0012] Conjugated diene of a block copolymer manufactured from (D) styrene and conjugated diene which are used by this invention is a butadiene or an isoprene, and is the block copolymer of styrene, a block copolymer of a butadiene and styrene, and an isoprene in detail. Specifically, this block copolymer is a stellate block copolymer of the shape of a branched chain indicated by U.S. Pat. No. 3281383, or the straight chain-like block copolymer which has at least three blocks like for example, (S1) -(Bu)- (S2) (Bu

shows a formation block for a block with which S1 and S2 are formed from styrene from a butadiene or an isoprene).

[0013] moreover, in making two or more sorts of different block copolymers at least contain in this invention At least one of them by stellate branched chain (D1)-like block copolymer It is desirable that the styrene content is 50 - 90 % of the weight, and other one [further at least] is the straight chain-like block copolymer which has a branched chain (D2)-like stellate block copolymer or at least three blocks, and the styrene content is 10 - 50 % of the weight. On a property of the manufacturing method, although a stellate block copolymer of the shape of this branched chain contains a straight chain-like block copolymer in many cases, it does not need to remove this and use of such mixture is possible for it. Moreover, a block copolymer manufactured from styrene and conjugated diene which are used by this invention could be hydrogenated respectively alternatively or partially, and only a double bond under block which consists of a monomer of a butadiene or an isoprene is saturated. In this invention, it is also possible to use alloy resin which kneaded a block copolymer with styrene resin and olefin system resin beforehand as a resin constituent of a block copolymer manufactured from (C) olefin system resin, (D) styrene, and conjugated diene, and a resin constituent of a publication can be used for JP,5-311009,A as the example of representation.

[0014] In order to maintain sufficient fabrication nature, a conductive resin constituent of this invention When it is filled up with carbon black so that a surface specific resistance value may be set to 102-1010 ohms, In the case of polyphenylene ether system resin, melt flow index (it measures according to JIS-K -7210) on 230 degrees C and conditions of 10kg of loads In the case of polystyrene system resin, in the case of ABS system resin, it is 220 degrees C and the conditions of 10kg of loads, and they are 0.1g / 10 minutes or more on 200 degrees C and conditions of 5kg of loads, respectively.

[0015] Furthermore, to a conductive resin constituent of this invention, in order to improve flow characteristic [of a constituent], and the dynamics property of mold goods if needed, it is possible to add various additives, such as lubricant, a plasticizer, processing aid, and a reinforcing agent, and other resinous principles.

[0016] It sets to this invention, and in order to knead and pelletize a raw material and to obtain a resin constituent, well-known methods, such as a Banbury mixer and an extruder, can be used. It is also possible to knead a raw material collectively on the occasion of kneading, and a thing gradually kneaded like of kneading separately styrene resin, carbon black and styrene resin, olefin system resin and styrene resin, and mixture of a block copolymer, and the kneading object being put in block at the end, and kneading it is also possible.

[0017]

[Example] Hereafter, an example explains this invention to details further.

After having used the raw material shown in one to example 7 table 1, measuring respectively at a raw material presentation rate shown in a table 2 and carrying out homogeneity mixing with a high-speed mixer, it kneaded using phi45mm vent type twin screw extruder, and pelletized by the strand cutting method. Next, what fabricated the pelletized resin constituent 500mm in the shape of a sheet by the T die of 500mm width of face using phi65mm extruder (ratio-of-length-to-diameter=28) was made into the sample M for evaluation, and what was fabricated with the injection making machine (100t) in the shape of a plate of a 1mm[in thickness] x120mm angle and the test piece

configuration for **** measurement was made into the sample N for evaluation. An evaluation result is shown in a table 4 and a table 5. In each example, omission of carbon black are [nothing] and were good.

[0018] After having used the raw material shown in a table 1 like one to example of comparison 7 example, measuring respectively at a raw material presentation rate shown in a table 3 and mixing to homogeneity with a high-speed mixer, it kneaded using phi45mm vent type twin screw extruder, and pelletized by the strand cutting method. Next, like [constituent / which was pelletized / resin] the example 1, Sample M and Sample N were fabricated and it considered as the sample for evaluation.

[0019] In addition, each evaluation was performed by the method shown below.

(1) With the RORESUTA surface-electrical-resistance meter (Mitsubishi Petrochemical Co., Ltd. make), inter-electrode was set to 10mm, and the surface specific resistance samples M and N measured ten points of the arbitration in a sample, and made the logarithmic-mean value the surface specific resistance value.

(2) Based on fracture point reinforcement and modulus-of-elasticity-in-tension JIS-K - 7113, the No. 1 form test piece was measured [Sample / M] by speed-of-testing 10 mm/min about the No. 2 form test piece and Sample N.

[0020] (3) Forced IC of QFP14mmx20mm/64pin on the surface of existence each sheet of carbon omission, and a plate sample by the 100g load, it was made to go 100 times by stroke 15mm, and the lead section of IC was observed with the microscope after that. The existence of black affixes, such as carbon black to the lead section, estimated.

(4) Based on JIS-K -7210, it measured about the pellet of MFI each example and the example of a comparison.

[0021]

[0026]

[Effect of the Invention] This conductive resin constituent is made to contain further one sort or two different sorts or more of block copolymers manufactured from olefin system resin, styrene, and conjugated diene in the conductive resin constituent for IC package which consists of at least one kind of thermoplastics and carbon black which were chosen from polyphenylene ether system resin, polystyrene system resin, or ABS system resin as explained above. The desorption of the carbon black by the wear at the time of contact with IC etc. becomes possible [obtaining the conductive resin constituent which decreased contamination of IC used as a cause etc. remarkably].

[Translation done.]